

# Mental Accounting as Self-Regulation: Representativeness to Goal-Derived Categories

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When making decisions, people group gains and losses. The way they choose to form these groupings, called "mental accounting", affects their decisions. Mental accounting is a powerful and intuitively compelling phenomenon. To this point, however, little attention has been devoted to the psychological principles that underlie mental accounting. In this article we explore the psychological processes that set up mental accounts and assign gains or losses to these accounts. We propose that (a) currently active goals set up mental accounts, and (b) gains and losses are weighted into these accounts proportionally to their representativeness to the goal that set up the account. We review existing evidence that supports this goals-representativeness view of mental accounting and describe new studies designed to test these proposals. We also review other choice phenomena (e.g., sunk costs and entrapment) in which mental accounting is involved. We suggest that mental accounting is a useful self-regulatory strategy, despite the fact that it can sometimes lead to irrational choices.

*Key Words:* mental accounting, decision making, goals, self-regulation, representativeness heuristic, similarity

When the Internal Revenue Service audits a business, they rely on Generally Accepted Accounting Principles (GAAP) to interpret the business's financial statements. Similarly, psychologists trying to understand how people keep track of the psychological costs and benefits<sup>1</sup> associated with a decision must know the "generally accepted *mental* accounting principles". In contrast to the fiscal GAAP the mental principles of dealing with costs and benefits appear at first somewhat disorganized as people appear quite willing to separate and recombine psychological costs and benefits into mental accounts in order to minimize the pain of the costs and to fully enjoy the benefits (Linville & Fischer, 1991). We suggest that mental accounting is not chaotic, but rather it is a mani-

festation of an important self-regulatory strategy.

In the context of consumer choice, mental accounting occurs when the decision to make a purchase is influenced by other concurrent or prior purchases. In other words, consumer choices are often not made in isolation of previous choices and mental accounting is the underlying principle. One well-known example is Tversky and Kahneman's (1981; Kahneman & Tversky, 1984) theater ticket vignette. In their study, all participants were told that they had decided to go to the theater. Some participants were asked if they would buy a second \$10 theater ticket after discovering that they had lost the first one. Other participants were asked if they would buy a \$10 theater ticket after discovering that they had lost a \$10 bill. Many more participants indicated that they would be willing to buy a ticket after having lost the \$10 bill than after having lost the theater ticket. Kahneman and Tversky suggest that the lost ticket is placed into a mental "theater ticket account" driving up the cost of the theater visit from \$10 to \$20. In contrast, the lost \$10 is not placed into the same account as the theater ticket. Thus, participants in the lost ticket condition are integrating the cost of a new ticket with the previous loss, but participants in the lost money condition are not.

In a second example in a consumer choice setting, Tversky and Kahneman (1981; see also Thaler, 1980) told participants that they were purchasing a calculator and a jacket from a store. The calculator cost \$25, and the jacket cost \$120. Some participants were told that if they drove 20 minutes to a new store, they could save \$15 on the calculator. Other participants were told that if they drove 20 minutes to a new store, they could save \$15 on the jacket. Participants were more likely to decide to go to the new store to save money on the calculator than on the jacket. This finding only makes sense if the costs of the jacket and the calculator are being placed

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<sup>1</sup> In business administration the terms profit, income/ revenue, utility, loss, expense and cost are reserved for clearly defined and separable functions. In this paper we do not adhere to these definitions because in our view people account, for example, specific gains as well as psychological - not necessarily monetary - utility. We do not make any statements about a separation of these terms within mental accounting.

into separate accounts and the savings is being applied only to the account corresponding to the item receiving the discount.

The theater ticket and calculator/jacket scenarios are intuitively compelling. Further, the basic explanation of separate mental accounts provides a plausible explanation of participants' choice process. There are two gaps in the mental accounting view, however. First, it is not clear how people decide when to lump two items into the same account and when to keep them separate. Second, there is a need for principles that elucidate how much weight an event is given in a mental account. For example, instead of entering a lost theater ticket with a weight of "1" and lost cash with a weight of "0" (i.e., not accounting it at all in the theater ticket account), the lost ticket might be given more weight in the theater ticket account than the lost cash. In this paper, we will propose a solution for these gaps. To support these proposals, we review published evidence and report some previously unpublished studies that we conducted to address these unresolved issues. We seek to advance our understanding for the psychological processes underlying mental accounting in order to better predict actual choice behavior in consumer situations.

We begin by characterizing the assumptions of the original mental accounting view which implies that mental accounts are discrete entities. Then, we extend the mental accounting framework by introducing two hypotheses that go beyond the original model. First, we suggest that mental accounts are categories that are organized around active goals. Second, we assume that people use the representativeness heuristic in order to assign and weight events into mental accounts. We call this view the *goals-representativeness model*.

### Discrete Mental Accounts

Tversky and Kahneman (1981; Kahneman & Tversky, 1984) suggested that people group certain acts and events into mental accounts. When deciding whether to take an action, they evaluate the action relative to the groupings (i.e., accounts) they have formed. Kahneman and Tversky suggest that accounts have different levels of inclusiveness. The least inclusive mental accounts, so called minimal accounts, include only the direct consequences of an act. Thus, minimal accounts do not include prior gains or losses, such as a lost theater ticket. Kahneman and Tversky (1984) propose "that people will spontaneously frame decisions in terms of [more inclusive] 'topical accounts' that, in the context of decision making, play a role analogous to that of 'good forms' in perception and of basic-level categories in cognition." (p. 347)

In addition to the evidence for the existence of mental accounting cited above, there is evidence that people's mental accounts can often be more inclusive than a minimal account. Specifically, people often take gains and losses associated with past events into consideration when making a decision involving future events (Arkes & Blumer, 1985; Laughhunn & Payne, 1984; Thaler, 1980; Thaler & Johnson, 1985). Thus, when people

decide whether to take an action, they consider more than just the direct consequences of that act, often integrating prior events with the consequences of the current one. Economists suggest that the consideration of prior gains and losses (called *sunk costs*) is an irrational choice strategy because the evaluation of each new event should not be influenced by prior gains and losses (Laughhunn & Payne, 1984; Thaler & Johnson, 1990; though see Tan and Yates, 1995). Intuitively, the rationale for ignoring sunk costs is that because a present choice can only affect future outcomes, it should only be evaluated in terms of its unique effects on future outcomes, that is, regardless of past actions taken by the decision maker.

In sum, a number of assumptions seem to characterize the original or *discrete mental accounting model*. First, in choice situations, people represent the choice in terms of a topical account (Kahneman & Tversky, 1984). Each "topic" sets up its own account. Second, gains receive positive account entries and losses receive negative account entries. Third, the larger the gain or loss, the larger the absolute value of the account entry. Fourth, a person who chooses between different action alternatives chooses the one that will introduce the most positive (or least negative) change judged against the mental account as a reference. We call this view of mental accounting discrete, because an event with a particular value is either placed entirely into an account or it is not.

### The Goals-Representativeness Model

In order to address the gaps in the mental accounting model, we suggest two extensions to the discrete view. First, we suggest that accounts are set up relative to the goals that are active during the choice situation. Second, each entry into an account is then weighted by the representativeness of the event to the goal that defines the account. Because the value of an event will vary as a function of the representativeness of the event to an active goal, we will refer to this view as the *continuous mental accounting view*.

### Goals as Definitions of Mental Accounts

An important issue in mental accounting involves the creation of mental accounts (Heath, 1995; Heath & Soll, 1996; Henderson & Peterson, 1992).<sup>2</sup> We propose that topical accounts are organized around active goals. In particular, mental accounts can be viewed as categories that allow events in the choice domain to be classified. These categories cannot be fixed entities within a rigid taxonomic structure, because accounts are often set up quickly in novel choice scenarios like the calculator and

<sup>2</sup> There is also some research suggesting that events are likely to be combined when they have the same valence, and segregated when they have opposite valence (Linville & Fischer, 1991; Thaler & Johnson, 1990), but this research seems focused primarily on how evaluations of events are combined once they have been placed into one mental account.

jacket example above. Rather, these categories resemble the *goal-derived* categories discussed by Barsalou (1991), who points out that a potentially limitless number of categories are goal-derived. These categories are not derived "bottom-up" via exemplars that are seen, but rather they are established "top-down" through conceptual combination to achieve current and novel goals. Many goal-derived categories are constructed on the spot because they are needed to reach goals that are novel, such as "ways to escape being killed by the Mafia" or "activities to do on a vacation in Japan with one's grandmother" (cf. Barsalou, 1991). Of course, a goal-derived category that is used frequently may be stored in memory.

Barsalou (1991) showed that variability in the judged typicality of exemplars of a taxonomic category (e.g., fruit or chair) is well explained by the similarity of the exemplar to the central tendency of the category. In contrast, the variability in typicality of exemplars of a goal-derived category (e.g., diet foods) is explained by their similarity to an ideal that supports the fulfillment of the central goals of the category (e.g., an ideal diet food tastes great and has no calories). Further, Barsalou finds that both taxonomic categories and goal-derived categories have a graded typicality structure with some exemplars that are good members of the category and some exemplars that are poor members. Thus, even categories that are derived on line behave like categories that already exist in the cognitive system. The facility of the cognitive system in constructing ad hoc categories strongly suggests that mental accounts can be set up on the fly as new events occur.

We propose that topical accounts are goal-derived categories as described by Barsalou (1991). For example, it is because of the active goal to visit the theater that people construct a mental "theater ticket" account. We must stress that topical accounts are set up on the basis of *active* goals, which then serve as references for inferring whether an account entry is positive or negative (see Brendl & Higgins, 1996). In most normal circumstances, losing a theater ticket is perceived as having a negative valence, but if one has the goal of *not* seeing a particular play, then the lost ticket will be perceived as having positive valence. Thus, the valence associated with an object is not an inherent attribute of the object, but rather is determined in relation to an individual's active goals. A goal is activated by setting it (Gollwitzer, 1993) and is deactivated by reaching it (cf. Lewin, 1926; Ovsiankina, 1928; Zeigarnik, 1927).

If mental accounts are organized around active goals, then we must examine the nature of goals in order to better understand the structure of mental accounts. In accord with previous work, we assume that goals can vary in their level of abstraction (Hoppe, 1931; Miller, Galanter, & Pribram, 1960; Powers, 1973; Vallacher & Wegner, 1985). *Abstract goals* involve abstract means and end-states. For example, a gambler might have an abstract goal of maximizing cash through gambling. More *specific goals* involve more specific means and end-states. For example, a gambler might have the specific goal of winning \$50 in a particular gamble being

offered. Goals are also hierarchically organized, with abstract superordinate goals connected to more specific subordinate goals that facilitate them. In the example above, the specific goal of winning \$50 in a particular gamble might be subordinate to that gambler's superordinate goal of maximizing cash through gambling.

The hierarchical structure of goals is important to the mental accounting framework, because we would expect to observe the integration of events when topical accounts are set up by superordinate goals. If a gambler organizes a mental account only around subordinate goals, then (s)he will not take past gains or losses into consideration when assessing a new gamble. In contrast, if that gambler organizes a mental account around a superordinate goal, then other actions that were performed in service of that goal will also be integrated into that mental account, and hence will affect the decision. Thus, from the goals-representativeness perspective, mental accounting phenomena imply that people are constructing mental accounts using superordinate goals. This assumption is consistent with evidence that people generally prefer to identify the goals related to their actions at a level of abstraction more general than the most specific level (Vallacher & Wegner, 1985, 1987).

This view of mental accounting emphasizes that active goals involve committing resources to them. In this sense, mental accounting is a special case of a general self-regulatory strategy in goal-striving. Pursuing a goal requires protecting it from competing goals (Kuhl, 1986), which can be accomplished by committing resources (e.g., money, attention, effort) to that goal rather than to others. Mental accounting may be a form of what Kuhl called "encoding control", which involves a selective encoding of perceptual input to protect the target goal (e.g., by encoding money as being associated with a to be protected goal rather than with a competing goal). We will pursue the relationship between mental accounting and other self-regulatory strategies below.

### *Representativeness as a Source for Weights of Account Entries*

Not only are goals important for setting up topical accounts, they are also crucial for determining the weight given to an account entry. An event is entered positively into an account if it supports the goal used to create the account, and it is entered negatively if it impedes the goal used to create the account. The magnitude of the account entry is proportional to the representativeness of the event to the goal setting up the account.<sup>3</sup> According to Tversky and Kahneman

Representativeness is a relation between a process

<sup>3</sup> The magnitude of the event itself is also proportional to the entry (e.g., winning \$500 has a greater magnitude when entered into an account set up by the goal to maximize cash than does winning \$50). However, a discussion of the intervening judgmental process involved in translating the magnitude of the event into account entries is beyond the scope of this paper.

or a model,  $M$ , and some instance or event,  $X$ , associated with that model. Representativeness, like similarity, can be assessed empirically, for example, by asking people to judge which of two events,  $X_1$  or  $X_2$ , is more representative of some model,  $M$ , or whether an event,  $X$ , is more representative of  $M_1$  or of  $M_2$ . (Tversky & Kahneman, 1982b, p. 85)

In the general case, representativeness involves assessing the similarity of an item to a general category that is important for making an inference about that item (e.g., Kahneman, Slovic, & Tversky, 1982; Kahneman & Tversky, 1972, 1973; Nisbett & Ross, 1980; Tversky & Kahneman, 1974, 1982b).<sup>4</sup> For example, in the famous lawyer-engineer problem, people judge the likelihood that a person is an engineer to be higher when the target person is more rather than less similar to the prototypical engineer while making little use of other information such as base-rates (Kahneman & Tversky, 1973). Typically, the representativeness heuristic has been used to explain judgments of frequency and probability.<sup>5</sup>

From the goals-representativeness perspective, when an event is to be entered into an account, the representativeness of the event to the goal setting up the account is first determined. An event can be representative of a goal in many ways. The event may involve a means that is typically used to carry out the goal. For example, a theater ticket is more representative of the goal of seeing a play than is cash. An event may also be representative of a goal if the end-state yielded by the event is similar to the end-state of the goal. For example, a gamble that pays cash is more representative of maximizing cash through gambling than is a gamble that pays chips. The more representative an event is of the goal that sets up the account, the greater the weight it will receive when entered into that account. For example, a previous loss of a theater ticket will receive more (negative) weight in a theater account than a previous loss of cash, because the ticket is more representative of seeing a play than is cash. An important implication of this hypothesis is that mental accounts are continuous and not discrete (Henderson & Peterson, 1992). Thus, an item can be entered into an account to varying degrees.

For the sake of completeness, we must distinguish between two ways to think about the weighting of events. One possibility is that events have a particular absolute value, and a certain amount of that value is entered into a particular mental account as a function of the representativeness of that event to the active goal that sets up the

account. This view is analogous to actual accounting practice, in which a material charge can be spread across many different accounts if that charge reflects funds spent in service of the topic of those accounts. The sum of the account entries would equal the total charge. On this view, if only part of the value of an event is entered into one account, then the additional value of that event is 'left over' and must be entered into one (or more) other accounts in order to balance the mental books. A second possibility (and one we favor) is that the actual value of an event is determined by its representativeness to an active goal. Thus, the amount entered into a mental account is typically the entire value of that event. Unlike real accounting, where an objective value must be placed on the books, in mental accounting, the value to be accounted is subjective, and is determined with reference to active goals. Thus, the perceived value of an event varies with the representativeness of the event to an active goal.

In sum, we suggest that a mental account is set up by an active goal that determines the content of the account, and that the representativeness of events to goals affects the weight of account entries.

#### *Evidence for Representativeness in Mental Accounting*

Research on mental accounting has begun to address the proposal that mental accounts are continuous rather than discrete (Heath, 1995; Heath & Soll, 1996; Henderson & Peterson, 1992; Linville & Fischer, 1991). Many of these studies involve decisions about consumer products, and thus they speak to the role of mental accounting in consumer behavior. In one line of work, Linville and Fischer (1991, p. 11) suggested that the likelihood that two events will be combined increases with the degree to which they can substitute for one another. Substitutability is assumed to be a continuous function. According to Linville and Fischer this substitutability, in turn, may depend on the similarity of the two events. Consistent with this assumption, Lewin (1935) found the substitutability of two actions is related to their similarity. However, he explicitly points out that it is not the similarity of two actions that determines their substitutability, but rather their similarity to the underlying goal. Thus, his findings are quite consistent with our proposal that weights in mental accounts are derived by the representativeness of entries to goal-derived mental accounts.

More direct evidence for the continuity of mental accounts comes from Henderson and Peterson (1992) who gave participants various sources of money and asked them to rank order them relative to different uses. For example, a money gift was rated as the first to be entered in a mental consumption account, but only fourth to be entered in a mental investment account. This observation is consistent with a money gift being a better member of a consumption account than of an investment account, although it leaves open why these different rank orders are observed.

Further research addresses this point. Heath and Soll (1996) had participants consider various kinds of entertainment. Their participants considered sports events to

<sup>4</sup> Current models of similarity suggest that the perceived similarity of a pair increases with its commonalities and decreases with its differences (Gentner & Markman, 1997; Tversky, 1977).

<sup>5</sup> Gigerenzer (1991) has criticized the use of the representativeness heuristic to explain judgments of frequency and probability. He argues that representativeness means likelihood in the context of the lawyer-engineer problem and can therefore not be used to explain judgments of likelihood. This criticism does not apply to the goals-representativeness model, which does not involve likelihood judgments.

be most typical of entertainment, party snacks least typical, and roller-skate rentals intermediate between the two. When participants imagined that they had already purchased an entertainment item, they indicated that this purchase would decrease the amount of money they would spend for this category during that week. The degree of this reduction for the prior purchase increased as the typicality of the purchase to the general goal category "entertainment" increased. Thus, the purchase of a ticket for a sports event reduced participants' willingness to make further entertainment purchases that week more than did the purchase of party snacks for the same amount of money. In the aggregate data this increase was continuous over the three levels of typicality.

This finding suggests that items that are highly typical of a category are given more weight than items that are less typical. In this way, the purchase of a typical item brings the total account balance down to a lower value than does the purchase of a less typical item, and thus makes additional expenditures less likely. This pattern of data is consistent with the goals-representativeness model. In contrast, the discrete model of mental accounting cannot predict that one item is given more weight than a second but less weight than a third in a mental account. These findings further support Heath and Soll's prediction that judgments of similarity of a type of expense to the type of account affect the degree to which the expense is weighed in the account.

Further evidence that the weight an entry is given in a mental account is related to its representativeness (or typicality) is provided by Brendl, Higgins, and Markman (1997, Study 1). In a within-participants vignette, participants judged the likelihood that students visiting a gambling casino would accept a gamble for a cash prize after losing a previous gamble. These students are expected to have the goal of maximizing cash during the gambling day, and so the mental account is assumed to be organized around this goal. The stake the students had lost in the previous gamble was either a gambling chip (rated as least similar to cash), a winnings check (rated as intermediate between cash and a gambling chip in its similarity to cash), or cash (which is most "similar" to cash).

Consistent with the goals-representativeness model, participants rated the student who lost a gambling chip in the previous gamble as most likely to gamble again, the student who lost cash as least likely to gamble again, and the student who lost a winnings check as intermediate between the other two students in willingness to gamble again. This result is consistent with the use of gambling chips rather than cash in casinos. In sum, according to goals-representativeness, the more representative a previous loss was of cash, the more negatively it was entered into the mental "maximize cash through gambling" account and the less likely a student was judged to gamble again. One might suggest an alternative explanation for these findings, namely that people generally avoid cash losses. Note, however, that this interpretation can be ruled out by the fact that participants judged the winnings-check student to be less likely to gamble than the gambling chip student.

The previous finding has also been obtained in a between-subjects design with real choices rather than simulated choices (Brendl et al., 1997, Study 2). Upon arrival in the laboratory each participant received an unexpected payment of \$13.50, either in cash or in gambling tickets which could be exchanged for cash at the end of the experiment. Participants were offered several gambles in which they could win cash. Again, participants should have a cash account because they wanted to maximize the amount of cash they could take home from the experiment. Each gamble cost a fee which participants had to pay from their initial \$13.50 stake. Pilot research established that gambling tickets (like gambling chips) are less representative of the cash account than is cash. Thus, compared to losing cash, losing gambling tickets should receive less negative weight in the cash account. Accordingly, participants spent considerably more on gambling when risking gambling tickets than when risking cash.

In the previous experiment it could be argued that people gamble more with gambling tickets than with cash, because they are following a conversational norm that the purpose of gambling tickets is gambling, while the primary purpose of cash is not gambling (for effects of conversational norms on judgement see Bless, Strack, & Schwarz, 1993; Fiedler, Semin, & Bolton, 1989; Schwarz, 1994; Strack & Martin, 1987; Hilton, 1995). On this objection, participants are assuming that the experimenter has given them gambling tickets because she expects them to gamble. In order to provide evidence against this interpretation, we conducted the following two studies. In the first study, we pit an option that should be selected by a conversational norm against another option that should be selected by goals-representativeness. To this end, we substituted a winnings check for a gambling ticket. If anything, a winnings-check should be perceived as an item to keep and take home rather than an instrument for gambling. Thus, if a conversational norm were responsible for the above effects, people should gamble *less* with a winnings-check than with cash. University of Konstanz students ( $N = 62$ ) read the following vignette (with orders of the described actors being counterbalanced between-participants).

Two college students are visiting a gambling casino. Each has won \$25 in the same gamble. *Student A received a winnings-check* that he can cash at any time and *student B received cash*.

Now, *student A* considers whether he should participate in the following gamble: He would have to put his \$25 *winnings-check* on the gambling table. The chance of losing is 50%, the chance of winning is also 50%. If he loses, his \$25 winnings-check goes to the casino. If he wins, he gets \$25 in cash and gets back his \$25 winnings-check from the table.

*Student B* considers participating in this same gamble as well. He would, however, have to put his \$25 in cash on the table. If he loses, his \$25 cash go to

the casino. If he wins, he gets \$25 in cash and gets back his \$25 stake from the table.

In your opinion, who is *more likely* to accept this gamble?

Please circle:      Student A      Student B  
                                  (N = 39)              (N = 23)

The student who would have to risk a winnings check was judged as most likely to gamble by more people ( $N=39$ ) than the student who would have to risk the cash ( $N=23$ )  $\chi^2(1, N=62) = 4.13, p < .05$ . This finding is consistent with goals-representativeness, which suggests that if participants hold the goal of maximizing cash through gambling, then lost cash (which is more similar to cash than is a winnings check) will be given more weight in the mental account than a winnings check. A larger negative weight will, of course, reduce willingness to gamble. Thus, this result is consistent with goals-representativeness but inconsistent with a conversational norms explanation. The next vignette reinforces this point.

Forty-six Columbia University students read the following vignette. They judged the likelihood of gambling after having paid a fee either with cash or with a check. In this vignette, the students each find \$25 in cash prior to paying the fee. In this way, the students from both alternatives start the gambling session with the same amount of money they had at the start of the vignette.

Imagine two college students are visiting a gambling casino. In front of the casino each student finds \$25 cash and puts the money in his wallet. Each student pays the \$25 entrance fee to enter the casino. *Student A* pays with *check* and *student B* pays with *cash*.

Neither student has decided yet whether to gamble or not. Both students consider the following gamble: You put \$25 in cash on the gambling table. You have a 50% chance of losing and a 50% chance of winning. If you lose, your money goes to the casino. If you win, you get \$25 in cash in addition to getting back the \$25 you put on the table. In your opinion, who is *more likely* to accept this gamble?

Please circle:      Student A      Student B  
                                  (N = 32)              (N = 14)

The student who paid the fee with cash was judged less likely to accept the gamble ( $N=14$ ) than the student who paid the fee with check ( $N=32$ ),  $\chi^2(1, N=46) = 7.04, p < .01$ . Again, if participants hold a goal of maximizing cash, then a cash payment is more similar to the cash goal than a check payment. Therefore, the cash payment receives a more negative weight in the account than the check payment. Thus, the overall account balance is more negative (or less positive) for the "cash fee"

student than for the "check fee" student. Consequently, the "cash fee" student should be less likely to gamble than the "check fee" student. Again, this result is predicted by goals-representativeness. In this case, an explanation based on conversational norms has no basis for favoring one option over the other.<sup>6</sup>

Although the previous studies have demonstrated effects of representativeness on the weighting of account entries with different kinds of accounts (e.g., cash, entertainment, sports), the account entries were always money. These effects are not restricted to cases where the entries are money, however. In a study by Heath (1995, Study 5), participants imagined that they had already invested some time in a consulting project that they believed would save them 21.5 hours on a second project. Finishing this first consulting project would then require a second investment of either time (i.e., putting in more hours) or money (e.g., purchasing equipment). When the initial time investment came close to the amount of time the project was expected to save (e.g., 17.5 hours), the likelihood that participants would choose to finish off the project with a money investment rather than a time investment was greater than if the initial investment was much less than the expected time savings (e.g., 5.3 hours). The opposite pattern was observed when the project budgets were described in terms of money. In this case, an initial expenditure that was close to the expected payoff (e.g., \$123 on a project expected to return \$150) made people more likely to invest additional time than additional money relative to a situation in which the initial expenditure was far from the expected payoff (e.g., \$37 on a project expected to return \$150).

The goals-representativeness model suggests that when the initial investment and the necessary second investment threaten to eat up the expected payoff (expressed in hours or dollars), people try to minimize the value of the negative account entry of the second investment by choosing it in a format that is not weighed as heavily into the project account. If the account currency is time, then a money investment, being "less similar to time than time", is weighed less heavily into the time account than a money investment. If the account currency is money, then a time investment, being less similar to money than money, is weighed less heavily into the account than a money investment. This effect is particularly prominent when the additional investment threatens to violate the goal that sets up the account. The above finding suggests that investments in a format other than that specified in the goal that defines a the mental account are weighed less heavily than investments in the same format as that specified in the goal.

In sum, the data we reviewed suggest that the discrete version of the mental accounting view needs to be augmented to permit continuous mental accounts (Heath,

<sup>6</sup> It is not crucial that the imaginary students both find cash in front of the casino. We added this phrase so that the imaginary students would have "psychologically" free access to the casino. This was supposed to act against the thought: if people pay a fee to get into a casino, they will play at least once.

1995; Heath & Soll, 1996; Henderson & Peterson, 1992). Further, the above results are consistent with our proposal that people weight entries into accounts according to the entries' representativeness of the account. Thus, representativeness provides a process by which events are assigned to accounts.

#### *Evidence for Goal-Derived Accounts*

In the previous section we focused on evidence for the proposal that people determine the weight of a mental account entry from the representativeness of the entry to the account. In this section, we focus on the prediction that mental accounts are organized by active goals. If mental accounts are set up by active goals, then we should be able to observe typical characteristics of goal striving in mental accounting: In both mental accounting and goal-striving people track events that are positive or negative and integrate them into an evaluation of a situation that goes beyond the mere act decided upon. In goal striving, for example, individuals evaluate how much closer (or further away) a decision will bring them to their goal while taking into account how close other decisions have brought them already. Similarly, in mental accounting individuals integrate the costs of a previously lost theater ticket with a newly bought one. In goal striving, the means for reaching a goal are perceived as causes for reaching the goal (Vallacher & Wegner, 1985), and often they involve a psychological cost, such as effort. This cost needs to be invested and integrated with the expected benefit of reaching the goal. Similarly, in mental accounting when a cost is seen as causally related to a benefit, the cost and benefit are more likely to be integrated into the same mental account (Hirst, Joyce, & Schadewald, 1994). Further, in goal striving people track how supportive or hindering events are for their goal only until they have reached the goal (cf. Lewin, 1926; Ovsiankina, 1928). The analogy in mental accounting is that when people purchase a product whose usefulness has a certain duration, such as a car, they prefer to account the cost (e.g., a loan) with the same duration rather than with a longer duration (Hirst et al., 1994). We suggest that this is the case because the cost is seen as a means, that is, a cause of obtaining use of the product, and events are more easily identified as causes when they precede an effect than when they follow it (cf. Tversky & Kahneman, 1982a; 1982b).

We performed a test of the hypothesis that only mental accounts with active goals accept new entries. In this study, Columbia University students ( $N = 51$ ) read the following vignette and indicated which of two students would be more (or less) likely to gamble. The "more versus less" question did not affect judgments and thus results are presented in terms of the "more question". Also counterbalancing the presentation order of the two students did not affect the results.

Imagine two college students are visiting a gambling casino. In front of the casino *student A* finds \$25 cash and puts the money in his wallet. Student A

and student B pay the \$25 entrance fee and enter the casino. Inside the casino *student B* finds \$25 cash and puts the money in his wallet.

Both students do not know yet whether to gamble or not. Both students consider the following gamble: You put \$25 on the gambling table. You have a 50% chance of losing and a 50% chance of winning. If you lose, your money goes to the casino. If you win, you get \$25 in cash in addition to getting back the \$25 you put on the table.

In your opinion, who is more likely to accept this gamble?

Please circle:      Student A      Student B  
                                 ( $N = 14$ )      ( $N = 37$ )

The student who finds the cash first and pays the fee afterwards was judged to accept the next gamble less often ( $N = 14$ ) than the student who pays the fee first and finds the cash afterwards ( $N = 37$ ),  $\chi^2(1, N = 51) = 10.37, p < .002$ . This result supports the hypothesis that entries are assigned to an account only as long as the account's goal is active. The student who finds the money first and then pays the fee is presumably seen as using the found money for paying the fee. By paying the fee, the student has discharged a goal with the found money. This money cannot then be applied to newly activated goals. In contrast, the student who finds the money after paying the fee can assign it to an account set up by the now activated goal of gambling. Thus, this study suggests that a mental account only accepts entries when the goal that sets up the account is active.

The study by Heath (1995) described above in which students either invested in a consulting project with a money or with a time payoff supports the hypothesis that representativeness judgments are made relative to active goals. We suggest that expecting a payoff in time versus money triggers a goal to gain time versus money. Accordingly, when the expected time payoff was threatened, and consequently reaching the time goal was threatened, preferences for investing in money instead of time rose. This result was reversed when the expected payoff and the goal was a cash profit.

The previous two studies can be criticized on the grounds that participants only mentally simulated their goals. In the following study, however, a naturalistic priming manipulation was employed to manipulate directly the activation of a bill-paying goal. We expected that when the bill-paying goal is active, events that are more representative of bill-paying are weighted more heavily into a bill-paying account. Brendl et al. (1997, Study 3) gave Columbia University students on campus the following questionnaire (the between-participants condition is printed in brackets):

Imagine the university was introducing a new measure to improve its financial situation: a university lottery. Out of all participants 10 would receive a \$1000 cash award [waiver applicable to any univer-

sity bill (e.g. to tuition or rent)] and you could find out whether you have a winning ticket right away.

We would like to know how much you would maximally pay for a ticket, if I offered one to you right now.

Both the cash and bill waiver conditions were given to students in two locations: students who were lining up at the bursar in order to pay their university bills, and students who were sitting at various campus cafeterias. For the bursar participants, the goal of paying their bills was presumably highly active and they should have been more likely to represent the lottery in a bill-paying account. For the cafeteria participants, the goal of paying a bill was presumably less active and thus they should have been less likely to represent the lottery in a bill-paying account. It follows from goals-representativeness that the bursar participants should weigh the bill-waiver more positively than the cafeteria participants because the bill-waiver is more representative of bill paying than is the cash award. Consistent with our expectations, the bursar participants indicated that they would pay more for a bill waiver ticket than for a cash award ticket. In contrast, the cafeteria participants indicated that they would pay less for a bill waiver ticket than for a cash award ticket.

Note that the objective value of the two awards was the same. Both \$1000 in cash, and a \$1000 bill waiver can be used to pay a bursar bill. Therefore, at the bursar location there is no obvious reason why people should value bill waivers more than cash. If anything, it could be argued that people should always prefer a money award, because money is fungible, and a bill waiver is not.<sup>7</sup> This study and the Heath (1995; Heath & Soll, 1996) studies also provide further evidence that the results showing a reluctance of people to risk cash stem from the representativeness of cash to an active cash goal rather than from a general preference for cash.

In sum, there is evidence consistent with the proposals that mental accounts are set up by currently active goals and that account entries are based on the representativeness of the entries to the account-defining goal. Further, this evidence comes from a diverse set of studies that varied different kinds of goals (cash maximization, time profits, bill paying), included goals that people actually held, and manipulated goal activation in different ways (time sequence of event and goal-fulfillment, mentally simulated goal content, experimental activation of goals). The available evidence is strongly consistent with the goals-representativeness model of mental accounting.

### Mental accounting and other forms of goal-striving?

At the outset, we suggested that mental accounting might be an important self-regulatory strategy in which people protect important goals from other competing

goals by committing resources to them. This strategy is important, because competing action tendencies tend to wax and wane for a variety of reasons (cf. Atkinson & Birch, 1970), and only a few (perhaps only one) (Simon, 1994) goal can be enacted at once. Thus, there is a danger that important goals could fail to be enacted because of short-term activation of competing goals. As an illustration, Shefrin and Thaler (1992) examined the conflict between immediate consumption of income and saving for retirement. Shefrin and Thaler suggest that mental accounting serves as a self-control strategy by pre-committing money for future purposes. By paying into a deferred compensation program like a pension, for example, people commit money to a mental account that will ensure their income during retirement. This strategy protects their future income goal from immediate and highly tempting consumption goals.

Research on delay of gratification provides an example of a similar self-regulatory strategy in another domain of goal striving (Mischel, Shoda, & Rodriguez, 1989). Analogous to the consumption versus pension conflict, small children are placed in the conflict of either immediately consuming a small reward (e.g., one marshmallow) or waiting an unspecified time to consume a larger reward (e.g., two marshmallows). Like the consumption hungry adults, who have their income at their immediate disposal, these children have the small reward at their immediate disposal sitting right in front of them on a table. When the children are told to think of the rewards as a picture, they can wait for the larger reward much longer than children who are not instructed in this encoding strategy. Apparently, like mental accountants who encode money as usable for a pension plan rather than for immediate consumption, these children encode the reward as only a picture rather than usable for consumption. This effect may be due to children's inability to view an object as both an object and a representation (e.g., a picture) at the same time (DeLoache and Burns, 1994). Thus, thinking about the immediate reward as a picture makes it less likely that it will be seen as satisfying the goal of eating a treat.

These encoding strategies may serve other functions besides protecting long-term goals from more tempting short-term goals. As an example in a consumer choice setting, we can consider a mental "vacation" account. By setting money aside for vacations, people might be able to enjoy their vacation without having to torment themselves about having violated other monetary goals, such as accumulating assets. As a second example, consider why one might not buy a second theater ticket after losing the first one. Perhaps mental accounting here leads to less consumption, because the price of the two tickets violates a goal of purchasing only reasonably priced goods, rather than because the money has been pre-committed to some specific alternative account. Thus, the function of mental accounting goes beyond being able to resist the temptation of immediate consumption, and may serve as a general mechanism for budgeting limited resources (see also Heath, 1995). Simon (1956) suggested: "Common denominators among needs may simply not exist, or may exist only in

<sup>7</sup> We thank Chip Heath for pointing out this issue to us.



very rudimentary form..." (p.137). Mental accounts may make a comparison of gains and losses across different needs or goals unnecessary because they first select which gains and losses are to be considered and simply ignore the rest.

In sum, goals-representativeness suggests that mental accounting is the result of an adaptive self-regulatory process that is aimed at protecting one goal from competing goals. It could be adaptive because humans, being unable to maximize a single utility goal in the way suggested by formal economic models, need strategies that permit efficient behavior with their limited resources. Whether mental accounting is adaptive must be decided by assessing its efficiency within the environment where it is actually used to make choices (cf. Gigerenzer & Goldstein, 1996; Simon, 1956). Securing long-term goals certainly seems to be advantageous. This does not mean that mental accounting cannot lead to some sub-optimal choices (e.g., preference reversals occur in the theater ticket problem [Tversky and Kahneman, 1981] or in the bursar-bill study [Brendl et al., 1997]). It rather means that mental accounting is generally reasonable.

### Some Effects of Mental Accounting on Choice Behavior

Economists agree that rational decision makers should only consider incremental losses and gains; that is, they should not factor past losses (i.e., sunk costs) or gains into the evaluation of their choice options (Laughunn & Payne, 1984; Thaler & Johnson, 1990). It is well documented, however, that people often include past losses and gains in their decisions, which suggests that mental accounting is at work. As a classic example, participants are asked to imagine that they are the president of an airline company, and they have to decide whether to invest 1 million dollars into the development of a new plane for which a competitor already has an advantage. Most participants in this case decide they would not invest the money in this project. If they are told that they have already invested 9 million dollars in the project, however, most participants in studies that have used this example decide that they would invest the money into this project, presumably because they do not want to waste the 9 million dollars already invested (Arkes & Blumer, 1985). Although such behavior is commonplace with large public investments it is irrational, because it throws good money after bad money. Apparently, people integrate the previously invested money, the money to be invested, and the money to be gained in one mental account. According to the goals-representativeness model, attending to sunk costs should be more likely when the prior losses are more representative of an active goal than when they are not. Sunk costs, and thus mental accounting, are thought to influence not only financial decisions but also persistence at an activity and commitment to relationships (cf. Rusbult, 1980).<sup>8</sup>

A related phenomenon is called entrapment (Brockner & Rubin, 1985) and escalation of commitment (Staw & Ross, 1987). Here people typically keep making small investments in the hopes of reaching the final goal (but see McCain, 1986, for limits on this effect). Thaler and Johnson (1990) suggest that people are reluctant to close a mental account with a negative balance. In Thaler and Johnson's (1985) "break-even effect", for example, people are more willing to accept a gamble that follows an initial loss when the gamble's potential gain could cancel out the initial loss. In sunk cost and entrapment research, it is usually implicit that the investments can improve or at least justify one's previous losses, suggesting a break-even component in these situations. Goals-representativeness cannot predict when an initial loss will make subsequent behavior risk-seeking or risk-averse (but see, e.g., Heath, 1995; Thaler & Johnson, 1990). However, it can predict the likelihood that a previous loss will affect a subsequent choice, because these phenomena presuppose inclusion of the previous loss and the subsequent decision into one mental account.

There are also cases for which previously experienced gains make people more risk seeking, as in the house-money effect (Thaler & Johnson, 1990). In a study by Arkes et al. (1994), for example, student participants were given money that they could use for gambling. Those participants who knew ahead of time that they would receive this money risked less money in actual gambles than those who did not expect to receive the money. These latter participants were presumably more surprised by receiving this extra money, and thus they were more likely to assign this money to a mental gambling account. This assignment made any loss in the subsequent gambling less painful because the gambling account started at a positive balance. From a goals-representativeness perspective this result resembles the studies described earlier suggesting that events are assigned only to accounts with active goals. The students who knew ahead of time that they would receive money were more likely to assign that money to other active goals. In contrast, the goal of gambling was much more active for the students who were surprised by receiving the money, and thus the money was assigned more readily to the gambling account. This explanation parallels the one we gave earlier for the study in which students found money either before or after paying a fee to enter a casino.

Of course, prior gains or losses are not the only situations in which mental accounting is relevant to consumer choice. Shefrin and Thaler (1992), for example, suggest that the typical household divides its wealth into three

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investments have been made. In many manufacturing situations, committing additional resources to complete the development of a product that has been determined to be inferior to one already on the market can still lead to a net gain for the company. In particular, the additional investment needed to bring the inferior product to market can lead to sales that help the company recoup some of the initial investment.

<sup>8</sup> As Tan and Yates (1995) point out, however, it is not always clear how to evaluate a choice situation in which previous

mental accounts that involve decreasing temptations to spend money. Spendable income has the highest temptation, current assets fall in the middle, and future income has the lowest temptation. Shefrin and Thaler state: "People tend to consume from income and leave perceived 'wealth' alone. The larger is a windfall [income], the more wealthlike it becomes, and the more likely it will be included in the less tempting assets account." (p. 321). Shefrin and Thaler report evidence by Landsberger (1966) that bears on this point: Israeli recipients of German restitution payments were less likely to spend this money on consumption, when the payment was large than when the payment was small. This view is quite consistent with goals-representativeness. Presumably a goal, such as financial security and the financing of expensive endeavors, sets up the assets account. Large amounts of money should be perceived as more typical of such a goal than small amounts of money, rendering large amounts to be more likely to be assigned to the assets account.

### Epilogue

For the mental auditor, deciphering Generally Accepted *Mental Accounting Principles* will require understanding people's goals in choice situations. Goals play two key roles in evaluating new choice situations. First, mental accounts are derived from active goals, so that active goals determine which prior events are integrated with the current event and which are segregated. Second, events are weighed into these accounts in terms of their representativeness of the goal. Viewed from a goals-representativeness perspective, mental accounting is a reasonable self-regulatory strategy that protects active goals, although it can lead to irrational choices in some cases. Beyond advancing our theoretical understanding of mental accounting, goals-representativeness helps us predict the occurrence of previously established effects of prior experience on choice, such as use of sunk costs or entrapment. Perhaps most importantly, this theoretical framework places mental accounting phenomena into the context of goal-striving. Thus, rather than viewing these phenomena as isolated instances of irrational behavior, we should view them as important manifestations of the way our self-regulatory system guides us to satisfy the goals most important to us.

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